

REMARKS

The application is believed to be in condition for allowance.

There are no outstanding formal matters.

Amendments

Claim 1 has been replaced with new claim 23 which recites the same invention making clear that the contact portion of the head has a hardness that removes aircraft mastic from an aircraft tank interior without scratching the tank interior, when the head is applied to the mastic and subjected to the selected vibratory frequency of movement. The recitation of removing mastic is supported at least by specification page 1, lines 7-9, page 3, line 11, page 9, lines 1-2, and page 10, lines 10-11.

Claims 15-17 now respectively recite that the head is made of polyoxymethylene, polyetherimide, and epoxy resin. These materials find support in the previous claim recitations and add no new matter.

Claim 3 now recites that the motor is a pneumatic motor with a vibratory frequency with an order of magnitude of 120 Hz. Claims 13-14 also recite a vibratory frequency. This recitation is supported by specification page 7, lines 16-17. No new matter is entered by way of this amendment.

Claim 14 has been amended to recite the steps in carrying out the invention.

Interview

Applicants appreciate Examiner Guidotti meeting with applicants' representatives and the attention and suggestions provided by her during that interview.

During the interview it appeared that the recited hardness and vibratory frequency of movement were not believed to be provided to achieve a particular purpose or to solve a stated problem. This is not true.

The importance of the mastic to sealing the aircraft tanks/wings, as well as some maintenance related issues, is reviewed in specification pages 1-2 through page 3, line 10. The discussion of the mastic removal process/problem begins at line 11 of page 3. It is explained that the aircraft mastic has high adherence which increases with time, as does the hardness of the mastic. Page 4 outlines that the mastic removal problem has not been solved by other methods, e.g., chemical solutions, ultrasound, water jets, cryogenic products, and abrasives. The constraint of avoid any scratching of the tank interior is discussed beginning at line 24 of page 4, and at page 6, beginning with line 17.

The vibration frequency is specified at page 7, lines 16-17. The dual requirement of removing mastic while not scratching the tank interior is given again at page 7, lines 23-26. Beginning with line 27 is disclosure of the two requirements being antithetical and that numerous tests were carried out to discover the suitable materials/hardness and vibratory frequency.

Claim 1 was rejected as obvious over TOPIARZ DE 19949071 in view of LANE 5,924,204.

Claims 1, 6-8, and 11-13, 15-16, 18, and 20-21 were rejected as obvious over PIERCE 5,353,465 in view of JP 05-321189.

Claims 3, 14, 17, 19, and 22 were also rejected as obvious over PIERCE in view of JP 05-321189.

Claim 9 was rejected as obvious over PIERCE in view of JP 05-321189 and SANDT 4,137,588.

Claim 10 was rejected as obvious over PIERCE in view of JP 05-321189, SANDT, and TOPIARZ.

All Recitations Must Be Considered

The Official Action is correct that the recited invention must be distinguish from the prior art based on recited structural features of the invention. However, recitations that have been given no patentable weight during the last Official Action do recite structural features of the invention.

Reference is made to MPEP 2173.05(g) "Functional Limitations [R-3]" where guidance is provided on this topic. Generally, a functional limitation defines something by what it does. The MPEP expressly states that "There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper." See *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

Indeed, the MPEP expressly states that a "functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an

element, ... to define a particular capability or purpose that is served by the recited element, ... ” (emphasis added).

For example, in *Innova/Pure Water Inc. v. Safari Water Filtration Sys. Inc.*, 381 F.3d 1111, 1117-20, 72 USPQ2d 1001, 1006-08 (Fed. Cir. 2004), the court noted that the claim term "operatively connected" is "a general descriptive claim term frequently used in patent drafting to reflect a functional relationship between claimed components," that is, the term "means the claimed components must be connected in a way to perform a designated function." Thus, "the term 'operatively connected' takes the full breath of its ordinary meaning, i.e., 'said tube [is] operatively connected to said cap' when the tube and cap are arranged in a manner capable of performing the function of filtering." *Id.* at 1120, 72 USPQ2d at 1008.

This MPEP section also notes that "It was held that the limitation used to define a radical on a chemical compound as 'incapable of forming a dye with said oxidizing developing agent' although functional, was perfectly acceptable because it set definite boundaries on the patent protection sought. *In re Barr*, 444 F.2d 588, 170 USPQ 33 (CCPA 1971)." Also, "In a claim that was directed to a kit of component parts capable of being assembled, the Court held that limitations such as 'members adapted to be positioned' and 'portions . . . being resiliently dilatable whereby said housing may be slidably positioned' serve to precisely define present structural attributes of interrelated component parts of the claimed assembly. *In re Venezia*, 530 F.2d 956, 189 USPQ 149 (CCPA 1976)."

Applicants are not claiming the mastic or the interior surface of the aircraft tanks, but rather are making reference to the mastic and the interior surface of the aircraft tanks in specifying the hardness of the head, e.g., claim 23 recites "the

selected material providing the contact portion with a hardness sufficient that, under the effect of vibratory alternating movement at the selected vibratory frequency, the contact portion removes the aircraft-fuel resistant mastic from joints in interiors of aircraft tanks without giving rise to scratches to the interior surface of the aircraft tanks”.

It is a hardness that is being recited. This recited hardness must be given patentable weight.

The recitations of the present claims, characterized as “functional”, are thus properly directed to the structure of the invention and must be given patentable weight.

The prior art does not teach a mastic removal tool with the recited hardness. Therefore, the claims are patentable.

Additional Reasons The Claims Are Non-Obvious

TOPIARZ is directed to a device with a frequency of at least 10 kHz and preferably above 15 kHz (page 5 lines 5-7). This is because TOPIARZ requires an extreme acceleration over a short path (a few thousandths of a millimeter) in order to achieve a high impact strength with each individual blow (page 5, lines 1-4). The high impact is necessary because the TOPIARZ device operates as a “jackhammer” crushing the joint compound which is being treated.

LANE teaches (Figures 2-4) a steel distal end 20 (column 4, lines 49-54) that is the actually cutting surface and non-metal material 32 located along the tool’s length. See in particular Figures 3-3A.

Thus, if LANE were used to modify TOPIARZ, a blade would result that had a steel distal end contact portion for actually cutting and the epoxy resin 32 located along the tool's length but not at the distal end contact portion.

Thus, claim 23 would not be rendered obvious as the combination would not provide for a distal end contact portion of the head for removing the mastic is made of a non-abrasive material selected from polyetheretherketones, polyoxymethylenes, polyetherimides or epoxy resins with the recited hardness.

Claim 23 is thus believed non-obvious over TOPIARZ in view of LANE is solicited.

The remaining rejections rest on the combination of PIERCE and JP 05-321189.

JP 05-321189 discloses a composite material suitable for appropriate applications, e.g., the doctor blade where damage to the paper rollers must be avoided. The concerns present in the application of the doctor blade, however, are not present in the tool of PIERCE where the scraper is used to scrape barnacles off of ship hulls (column 1, lines 5-12).

One of skill would recognize that there is no concern about minor scratching the ship's hull. Indeed, after the scraping treatment, the ship's hull will be painted or retain a painted surface.

The rejection is not based on common sense as the rejection does not take into account the scale of hardness of the different applications/uses of the invention and the applied references.

One needs to focus on the fact that there is a scale of hardness. For example, in the invention the scale of hardness is specific to scraping mastic that is hard but not

too much because it's a polymer. Previously, such mastic was scraped "by hand" with a manual tool.

In the PIERCE barnacle application/use, the scale of hardness needed is much greater as barnacles are shells and are very hard because they have a mineral composition. These barnacles/shells are really "cemented" to the hull and one has to use a very, very hard blade and heavy tool to remove the shell from the ship's hull. There is no concern about damaging the hull as the paint may be damaged without any problem as the hull can be grinded and repainted.

The JP 05-321189 material is disclosed for a doctor blade used for scraping paper tailings, etc. off the surface of roll for paper making machine. That scale of hardness for a doctor blade scraping paper tailings is very different from the scale of hardness for removing barnacles/shells cemented to a ship's hull. There is no teaching in JP 05-321189 that this material would be appropriate for removing barnacles cemented to a ship's hull.

Thus, there is no reason to believe that the JP 05-321189 material would be suitable as a substitute for the PIERCE purpose of removing barnacles.

Additionally, there is no viable showing that one of skill would choose such a complex composite material for the simple job of scraping barnacles of a ship's hull. One of skill would not choose a more expensive composite material unless there was a real advantage in doing so.

Note that the latest guidance from the Supreme Court (*KSR International Co. v. Teleflex Inc.* Slip Opinion No. 04-1350 Decided April 30, 2007) provides that the teaching, suggestion, motivation test captures the concepts that an invention composed of several elements is not proved obvious merely by demonstrating that each

element was, independently, known in the prior art, and notes the importance to identify the reason that would have prompted a person of ordinary skill in the art to combine the elements as the new invention does. See the Syllabus which notes that inventions usually rely upon building blocks long since uncovered, and claimed discoveries almost necessarily will be combinations of what, in some sense, is already known.

The rejection just finds known “building blocks” and fails to offer a viable reason for discarding a conventional scraper for a comparatively complex composite material scraper.

Thus, this obviousness rejection/combination improperly rests on pure hindsight. The analysis is not whether the prior art had the technology/materials to achieve the invention, but rather the invention is taught or suggested by the prior art.

The Examiner has only shown that a suitable material was in the prior art, and has not shown that one of skill would use this material to modify PIERCE. It is not enough to show that the modification would be possible, the modification must be obvious to render the claim unpatentable.

The Official Action has only offered a *pro forma* reason why the JP 05-321189 material would be incorporated into PIERCE. Other than pointing to some general advantages mentioned in the JP 05-321189 “USE/ADVANTAGE” section (“The doctor blade is used for scraping paper tailings, etc. off the surface of roll for paper making machine, etc; it shows close contact with the roll surface, does not cause damage to roll surface, has improved resistance to wear and ensures good scraping operation”), the

rejection does not seriously consider whether this material would be suitable for the tool of PIERCE or whether it would be an economically feasible choice.

By analogy, although it would be possible to paint a ship's hull with an artist's fine brush, such an approach would not be obvious to one of skill as it is not economic or practical.

The rejection does not pass a common sense test as there is no viable showing that one of skill would choose such a complex composite material for the simple job of scraping barnacles off a ship's hull.

Reconsideration and allowance of all the claims are respectfully requested.

Should there be any matters that need to be resolved in the present application; the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Any additional fees due in connection with the filing of this Amendment may be charged to Deposit Account No. 23-0035.

Respectfully submitted,

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